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A black and white photograph of the Brookfield Zoo's Seven Seas Panorama building. The building has a unique, undulating, dome-like roofline supported by thick columns. Bare trees are visible in the foreground and background. A stamp is overlaid on the image.

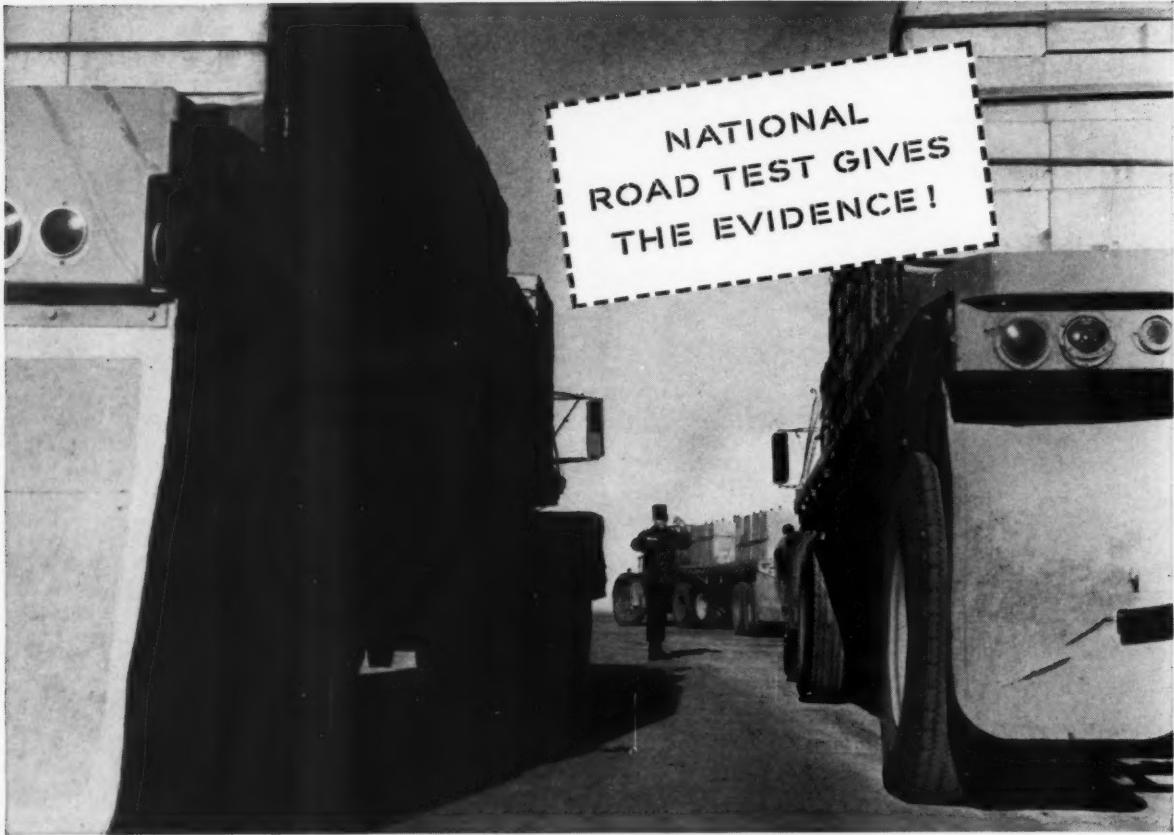
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TECHNOLOGY
DEPARTMENT

Over Picture: Brookfield Zoo's Seven Seas Panorama Page 6

WASHINGTON AWARD — Pictorial Review Pages 12-13



Concrete wins over asphalt these basic ways...

Sponsored by The American Association of State Highway Officials (AASHO) . . . directed by the Highway Research Board of the National Academy of Sciences—National Research Council. Here is the most scientific pavement test ever made. Accurate instrumentation checked performance of test sections during 2 full years of traffic. 99 trucks, 19 hours daily, 6 days a week. There were 17 million miles of travel—1,113,762 load applications! Your state helped finance this test to provide better highways...maximum value from every tax dollar.

1

DURABILITY

A count of pavement sections surviving in the great National Road Test, after two full years of traffic, showed concrete outlasted asphalt 3 to 1! Here is new confirmation that concrete gives more for tax dollars.

2

DRIVING COMFORT

In ratings of how test pavements retained the riding quality they started with, concrete won over asphalt by a wide margin. Only concrete can give lasting driving comfort and do it without excessive upkeep.

PORLAND CEMENT ASSOCIATION

111 West Washington Street, Chicago 2, Ill. A national organization to improve and extend the uses of concrete

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Midwest Engineer

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Use More Illinois Coal

Illinois coal is being used increasingly in the production of metallurgical coke and its much greater use in the future seems assured, Hubert E. Risser, of Urbana, Mineral Economist of the Illinois State Geological Survey, said in a paper recently presented before the Coal Division of the Society of Mining Engineers. He discussed the adaptability of Illinois coal for use in iron and steel production.

"One of the principal advantages of Illinois coal is its nearness to the Illinois and Indiana steel centers," Mr. Risser pointed out.

Mr. Risser went on to say:

"Technological trends that have promoted the upgrading of Illinois coals and their blending for use in coke ovens, together with economic trends that have placed Illinois coals in a favorable position, are largely responsible for the increased use of Illinois coal in the past. Still another factor which will strengthen the position of Illinois coals over the years to come is the declining reserves and availability of the major coking coals now in use."

Inland Now Producing Thin Gauge Tin Plate

Inland Steel has started production of thin gage tin plate at its Indiana Harbor Works. This "thin tin," is made by producing tin plate in the conventional manner and then reducing it to half its original thickness by an extra cold rolling.

Inland will produce thin tin on existing equipment using the newest of its three electrolytic tinning lines. It was

completed last September in an expansion move that lifted the company's tin plate capacity 65 per cent to 435,000 tons a year.

Apr. 26th Luncheon Talk— "The Professional Profile"

Robert J. Newbury, Executive Director of the Illinois Society of Professional Engineers, will be the speaker at the April 26th Noon Luncheon. He has selected "The Professional Profile" as his subject, and will discuss the professional engineer's status in relation to his chosen field of practice. For four years prior to assuming his present office last September, Mr. Newbury was Executive Secretary of the Minnesota Society of Engineers. He holds a Bachelor of Science Degree from the University of Minnesota in speech and public relations.

Eta Kappa Nu Offers Its Career Guidance Program

Chicago Alumni Chapter—Eta Kappa Nu Association—Electrical Engineering Honor Society—sponsors a Career Guidance Program offered to schools for the benefit of students interested in engineering. The program includes the assistance of a qualified engineer delivering a lecture, or monitoring one or two films which create visual examples of engineering problems in the fields of industry or science. Either may be followed by open discussion or a question and answer period. Stress is put on educational requirements, opportunities and salaries. Interested schools may contact: L. R. Stensland, c/o Sargent & Lundy Engineers, 140 South Dearborn St., Chicago 3, Ill.

Calendar of Chicago Engineering

—APR. 19, WED., Noon Luncheon Meeting, 12:00 noon. At WSE Hq.

—APR. 19, WED., West Suburban Division Meeting and Dinner at Remick's Lilac Lodge, Wolf and Cermak Rds., Hillside, Ill. Dinner 6:30-7:30

—APR. 25, TUES., WSE General Meeting and Dinner. Social Hour (5:15-6:15 p.m.). Dinner (6:30 p.m.). Technical

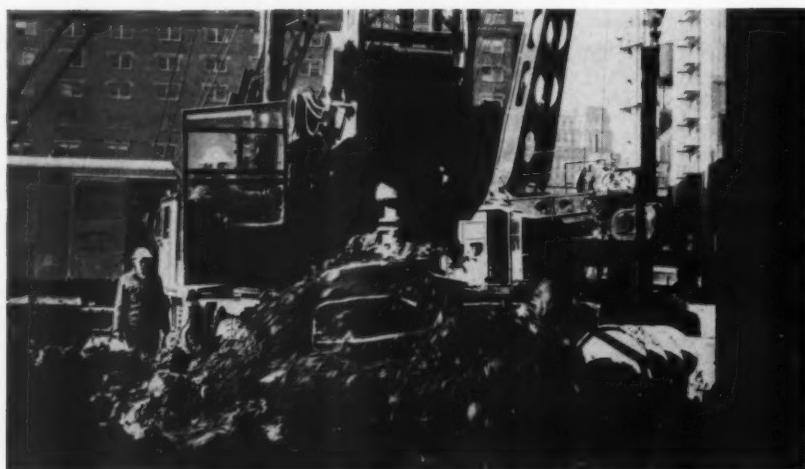
Sessions (8:00). At WSE Hq.

—APR. 26, WED., Noon Luncheon Meeting, 12:00 noon. At WSE Hq.

—MAY 3, WED., Noon Luncheon Meeting, 12:00 noon. At WSE Hq.

—MAY 10, WED., Noon Luncheon Meeting, 12:00 noon. At WSE Hq.

World's Largest Construction Drill Speeds Vast Foundation Job



Giant rig spins off ground withdrawn from caisson shaft during drilling operations at Marina City site. Although the rig rises to a height of 8 stories and weighs more than 120 tons, it can be operated with pinpoint precision. Shaft drilled here is only about one foot away from a steel column support for the State St. bridge spanning the Chicago River.

Work on the caisson foundations for the Marina City project ran right on schedule and was completed March 15th. This permitted above-the-ground construction to proceed on the 36 million dollar dwelling units and recreational center. The crews of Case Foundation Co. completed the job in 85 working days.

Due to the location of the project (Chicago River between State and Dearborn streets) the drilling operation was faced with three serious problems. These were: artesian well water, water seepage from the river which had flooded abandoned freight tunnels, and the presence of a powdery "rock flour" deposited by prehistoric glaciers. These were overcome by the following procedure.

Chemical De-watering

Drilled shafts were first de-watered by using a special chemical, which congealed the water into a mud-like substance for easy removal, and the shafts were then lined with steel sleeves to cut off further penetration of both the water and the rock flour. Concrete was then poured into these sleeves down to bed-

rock 115 feet below ground level where it formed a permanent bond with this firm, unyielding rock strata.

The ability of Case crews to maintain a strict work schedule despite severe winter weather has been enhanced by the use of the company's revolutionary 51-B, high speed caisson drill, an enormous 8-story high construction tool weighing more than 120 tons.

Built by Case engineers and mechanics at a cost of more than \$325,000, the patented drill is the only one of its type in the world with the ability to drill to the record depth of 200 feet through any type of soil or natural or man-made obstruction below ground level.

This is the first time it is being used on a major construction project following a year of extensive tests. Case officials announced the drill has performed with "outstanding results" and will be used in other projects throughout the U.S., Canada and Central America, allowing numerous important building plans, which previously had been held up because of the lack of such a drill, to now go ahead.

Drills through any type soil or obstruction to depths of 200 ft.

A total of 154 caissons were installed in the Marina City project, each one a solid column of concrete 5½ ft. in diameter reinforced with steel rods. Over 50 million pounds of concrete and steel were used for this job.

Other projects on which Case has handled exceptionally large caisson foundation installations have been at O'Hare International Airport and at Robert R. Taylor Homes on the South Side. The O'Hare jobs were for the elevated roadway and entrance bridge and for the main terminal building for a total of more than 300 caissons.

The world's largest construction drill, pictured here, was designed and built by Case Foundation Co., Roselle, Ill. It was placed in actual service for the first time at the Marina project. It weighs more than 120 tons and has the capacity to drill through any type of soil down to solid rock to depths as low as 200 feet and to install concrete caisson foundations as large as 15 feet in diameter.

Rig is powered with a 350 h.p. Caterpillar D-375 torque converter diesel engine turning a 26" rotary "Gumbo Buster" drill table complete with forward-reverse gear, Westinghouse air-controlled. Air-actuated clutches give operator finger-tip control.



How to Lay Out A Parking Lot

The first step in laying out a parking area is to list all the factors which must be taken into consideration.

These will include the following:

1. Dimensions—length and width.
2. Entrances and exits. Are the streets one way or two way? Is an alley involved in either entrance or exit?
3. Turning radius. Is there enough room for cars to make the turns necessary for entrance or exit?
4. Customers using lot. If lot is largely patronized by women, parking stalls must be wider and parking aisles wide enough for easy entrance and exit from stalls.
5. Automatic or attendant operated. In many cases attendant lots require parking shacks which are not necessary for automatic lots.

After listing all these factors, you can then proceed with the lot layout.

The Ideal Layout

The ideal lot layout provides for parking the maximum number of cars, with the stalls or aisles wide enough so parking is made as easy as possible.

The average commercial operator wants to park as many cars as possible. He will probably lay out an area with narrower stalls and aisles than a food store will use. This is especially true on attendant operated lots.

Basic Factor

Basically the width of the parking area determines the angle of the parking stall, whether it be 45°, 60°, 90° or some other angle.

It has been estimated that a 90° angle with an ideal 9' stall and 19' overall car length, requires a 24' aisle. Consequently, one row of cars parked at 90° requires a 43' width dimension.

45° angle parking providing a 9' width stall, 19'-10" length requires a 13' driving aisle. Therefore, one row of cars parked at 45° angle necessitates 32'-10" feet of width.

60° angle using ideal 9' width stalls use 21 ft. of length, but require only 18' aisles, which enables one row of cars to be parked within a 39' width.

The length of the lot determines the number of 8', 8'-6", 9', 9'-6" or 10' stalls that can be recommended.

The following significant facts become self-evident:

1. As the angle of the stall becomes more abrupt or increases, the number of feet of aisle space increases.
2. A greater number of cars can be parked on 90° than 60° using the same stall width.

The wider the stall, the sooner the driver can start turning, thus reducing the aisle width.

Application of the following table to your own lot dimensions will assist you to make the proper decisions on the appropriate angle.

	90° Parking	60° Parking	45° Parking
1 Row	43' Lot	39' Lot	32'-10" Lot
2 Rows	62' Lot	60' Lot	49'-5" Lot
3 Rows	105' Lot	99' Lot	79' Lot
4 Rows	124' Lot	120' Lot	98'-10" Lot

The 1961 edition of a 40-page manual titled "How to Lay Out a Parking Lot" covers all 1960 and 1961 cars, including the compacts.

Detailed sketches and photographs provide a variety of parking lot plans.

Space requirements are detailed for specialized lots serving stores, stadiums, banks, bowling alleys, churches, offices, hospitals, hotels and factories.

Mechanical aids, such as coin and token, operated parking gates, as well as parking barriers and guides are described.

For copies of "How to Lay Out a Parking Lot," write to Western Industries, Inc., Parking Gate Division, 2742 West 36th Place, Chicago 32, Illinois.

WSE General Meeting — Feb. 28th

Last month's activities not only marked the observance of the Washington Award but offered programs of exceptional interest which were presented at the regular luncheon and civic meetings. Here, too special mention must be made of the General Meeting of February 28th.

In reviewing some of these meetings it may be recalled that the gathering of February 28th offered a triple treat: a guest speaker at the dinner program with a subject of vital personal interest to almost everyone, and two technical sessions providing most recent information on developments in two vital fields of engineering.

The dinner speaker was Mr. L. W. Olson, Supervisor of Data, Municipal Court of Chicago, Traffic Violations Bureau. He discussed recently installed

impressive as was the tremendous number of cases of various types which have to be handled daily.

Subject of the first technical session was "What's Ahead for the Iron Blast Furnace," with Thomas L. Joseph, Professor of Metallurgical Engineering, University of Minnesota as the speaker. He is recognized for his work in steel metallurgy and is an authority on the blast furnace.

The second technical session was presented in two parts: 1) "Use of Particle Beams for High Energy Accelerators," by Roger H. Hildebrand, Director of High Energy Physics Division of Argonne National Laboratory. Part 2 was on "Layout and Structural Features of Argonne Synchrotron," by John P. Fitzpatrick, Associate Director of Particle Accelerator Division of Argonne National Laboratory.



Speakers at Second Technical Session: Left—John P. Fitzpatrick, right—Roger H. Hildebrand.

equipment for keeping track of traffic infractions. The intricate work of this equipment, as he described it, was most

A report of the March General Meeting and recent luncheon meeting will appear in May issue.

Brookfield's Seven Seas Panorama Opens to Public This Summer

Concrete cantilever-type building
features removable plastic dome

The Brookfield Zoo's new Seaquarium, or Seven Seas Panorama, pictured on the cover, is the first such exhibition building in the middle west.

Its design, achieving a highly distinctive appearance, is influenced by the desire to achieve a maximum of visibility and comfort for the audience witnessing performances of porpoises in the main tank through elimination of pillars or other obstructions. This design also contributes to convenience of visitors who look into the tank through windows on the lower level.

Topping the tank auditorium is a plexiglass dome supported by a fiber-glass frame. Dome and frame can be removed so that spectators can sit in the open air during pleasant weather.

The main tank is over 100 feet long, 25 feet wide with a maximum depth of 16 feet which tapers off to 5 feet at each end. Water capacity is 185,000 gallons. Salt from a pit is dispensed automatically to provide a salt content of approximately 4%. Water is filtered every 1½ hours. A plastic pipe line carries the water to the filter building containing units utilizing diatomaceous earth and returns it again to the tank.

In addition to the main tank the exhibit includes outside tanks for sea lions

and sea elephants, a penguin building and tanks that may be used for fish.

The Seaquarium's construction is of the cantilever type. Concrete was applied by Gunite method over metal lath. Overall dimensions of building are 69' by 144'.

Architects for the building are Olsen and Urbain. Russell L. Read, who has specialized in zoo projects and animal housing, is the designer. Gen. Contractors are Campbell Lowrie & Lautermilch Corp.

Super-Fast Atom Probe Is Called "Pilac"

Investigations in many areas of physics are continually probing what one may call the time frontier—namely, the frontier in the study of ultra-fast events. Such events are, for example, the transitions of atoms, nuclei, and elementary particles from one state or condition to another. These transitions may occur in intervals as short as a billionth of a second or much less. Also, velocity measurements of very fast moving particles such as energetic neutrons or mesons require the ultimate in fast moving techniques.

In recent years measurement in the range of one billionth of a second has

become commonplace and the technical term for a billionth of a second—nonosecond—is becoming ever more familiar. A powerful new tool for the study of nanosecond events, particularly in nuclear phenomena has recently been developed. It incorporates an idea for a so-called "compression" magnet proposed independently by R. G. Mobley of Louisiana State University and R. J. Van de Graaff of MIT in 1952.

The system operates in such a way that a steady or dc current of high energy ions is converted into a train of intense, equally spaced bursts each only a fraction of a billionth of a second long. The system has been given the name "Pilac" for "Pulsed Ion Linear Accelerator." The device is made by the High Voltage Engineering Corp., Burlington, Mass. Collaborating in its production were Dr. Lawrence Cranberg of the Los Alamos Scientific Laboratory, Prof. E. F. Shrader of Case Institute of Technology, Prof. H. A. Enge of M.I.T., and R. A. Fernald and F. S. Hahn of High Voltage Engineering Corp.

Offer 80 rental films on work simplification

Over 80 work simplification and training films are offered in the 1961 rental catalog of the Industrial Management Society, 330 South Wells St., Chicago 8, Ill. These 16 mm films have been produced by leading companies and universities and are of about 15 minutes running time. Typical films are: "Work Simplification in the Tool Room," "Work Simplification Parade," (electronics manufacture), "Heat Treat" (better methods involved in heat treating water hardened fine grain steel gears), and "Introduction to Motion Economy" (study of drill press operations).

Fiberglass tanks made by Apex Reinforced Plastics (a division of White Sewing Machine Corp.), Cleveland 13, Ohio, offer the advantages of weight savings and rust resistance under hard service conditions imposed when installed on truck-mounted concrete mixers. They weigh 66% less than steel tanks of comparable size. Natural translucence of the fiberglass makes the fluid level visible at all times with need for gauges often eliminated.

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No Limit to Usefulness Of Precipitators

Electrostatic precipitation, which has been "one of the work horses" of air pollution control for the past 50 years, will continue to clean the air we breathe, "particularly where large volumes of industrial waste gases are to be cleaned economically to consistently high purities."

Waste material is removed from industrial processes, usually in chimneys, by creating high voltage electrical fields which charge the waste particles so that they cling to collector electrodes. The phenomenon was first observed in 1600 by William Gilbert in England, and the first attempt to apply it commercially was made in 1885 in a lead smelting works in North Wales. In 1907 F. G. Cottrell "converted the process from a laboratory curiosity into a successful method of cleaning industrial gases by devising a better method of supplying the high-voltage power essential to the process."

Largest Applications

The largest single application of electrostatic precipitators to date has been fly ash removal from "the tremendous quantities of gases emitted from pulverized coal fired boilers." Fifty per cent of precipitation equipment used by industry is for this application. More than 600 such precipitators are now in use.

Other uses are in acid mist collection, cement and gypsum dust collection, cement kiln exhaust gas collection, blast furnace, gas cleaning in steel mills, open hearth gas cleaning, oxygen converter gas cleaning, tar and oil mist collection, catalyst fines recovery, phosphorous gas cleaning and recovery of chemicals in the operation of Kraft and soda pulp mills.

Potential possibilities in the future use of precipitators are as "dust agglomerators to enhance the operation of other types of collectors, such as cyclones and scrubbers on fine or submicron particulate matter" to enhance their efficiency and reduce losses and development of precipitators "for high pressure operation above the present maximum of 125 psig. As new high pressure chemical processes develop, there will be a need for collectors to clean processes at pres-

sures in the 1000 psig range."

They said that there "is no theoretical limit, other than an economical one, to the attainable efficiency of a Cottrell precipitator."

(Summarized from remarks of A. B. Walker and E. J. Malarkey before the American Institute of Chemical Engineers.)

Charts Plot Ideal Insulation Thickness

Dividend Engineering, a new system developed by Owens-Corning Fiberglas for estimating thermal performance of buildings, was introduced to Chicago architects and engineers at a meeting in the Morrison Hotel last month.

The new system utilizes thermo-economic data compiled from over 20 years of performance figures for thousands of industrial and commercial buildings and plants. This information has been converted into evaluation-analysis charts which clearly identify ideal insulation thicknesses in terms of dollars-and-cents savings in initial equipment and building operating costs, resulting in highest return on the owner's investment. This analysis takes into account factors such as cost of equipment and energy.

The Day They Pull The Rods on the N. S. Savannah

Once they pull the rods on the N. S. Savannah the nuclear powered vessel will be able to cruise for three years without refueling. So states the Special Report of United States Steel Corp. Continuing to quote from it in part it is explained how 692 pounds of uranium-235 do the trick. The fuel core is roughly a five-foot cube containing uranium oxide enriched with U-235. Fuel pellets are packed into stainless steel tubes—164 of them in each of the 32 fuel elements. Separating the fuel elements are the control rods, cruciform shaped rods of boron-containing stainless steel that are inserted or withdrawn to control neutron bombardment and fission.

The original Savannah, sailed from Savannah, Ga. to Liverpool in May 1819, became the first ship to cross the Atlantic using steam.*

Turn of the screw. Heat is what makes the Savannah go. Her reactor vessel is called a pressurized water reactor. It works on the principle that water under high pressure can be heated to high temperatures without boiling. The water coolant circulates through

An example cited in a new booklet tells how the Panero Engineering Co. of New York used Dividend Engineering data to analyze various possible roof insulation thicknesses for the new Singer Distributing Center Building. This analysis revealed that \$38,000 additional insulation (4 inches vs 1 inch) would reflect itself in a \$91,000 savings on a smaller heating-cooling unit because of the large reduction of heat loss and gain through the roof. The added insulation would also produce an annual operating cost savings of \$8,930. Therefore, the cost of the added insulation is paid back to the owner in about 4 years.

Builder Hands Out Booklet to Sidewalk Superintendents

A 16-page booklet has been published by a New York construction firm to give "sidewalk superintendents" some basic knowledge of what's actually going on as they observe day by day the construction of a building.

The booklet is being passed out to watchers at the site of a 29-story office building at 250 Broadway. To date some 25,000 copies have been given away.

Henry Minskoff, president of Sam Minskoff & Co. is enthusiastic about the response reflected in telephone and mail requests for copies.

The hot, fissioning core in stainless steel tubes, picks up heat and carries it to a stainless steel heat exchanger where it gives up its heat to water under much lower pressure in the secondary loop and turns it to steam. The steam drives huge turbines that transfer their energy to the screw through a double-reduction gear, and the payoff is a whopping 20,000 shaft horsepower.

The primary reactor loop is a marvel of engineering. Every ounce of metal that comes in contact with the coolant is stainless steel. So are the innards of the pumps and valves and pressurizers that control its flow. It's what they call a zero leakage system, and one of the ways they've made sure there's zero leakage is to X-Ray every single inch of stainless steel and welds to make sure there are no defects. The machinery was put together in shops that approach surgical cleanliness.

The entire primary system is stainless steel, including the stainless control rods that have a touch of boron added to absorb neutrons. There are eight miles of $\frac{3}{4}$ " stainless tubing in the heat exchanger alone.

*The tiny, 320-ton wooden vessel could carry only enough coal and wood for 89 hours of steaming, used sail most of the way. She refueled at Ireland, and so started the British when she approached Liverpool without a sail set that they sent a cutter after her and fired several shots across her bow. The crossing took 29 days and 11 hours.

NONFERROUS NEWS

Aluminum from Common Clay

Aluminum from common clay may be the result of a new process developed by Olin Mathieson Chemical Corp. It has been announced that the company has developed, through the pilot plant stage, an economical method of purifying aluminum sulfate extracted by an acid process from clay and shales. The aluminum sulfate can then be processed into alumina.

This is seen as making it possible to produce aluminum where cheap power exists with no compromise on plant location to suit both raw material and power source. Also, many plants have been located at deep water ports for receipt of bauxite from foreign areas.

Crystals produced by the new process are described as coarse and sandlike making them inexpensive to handle. Aluminum sulfate normally forms mushy crystals that are difficult to separate from the impure solution.

Manganese in Aluminum

In binary alloys, manganese improves the strength of aluminum by 20% with no sacrifice in corrosion resistance. Therefore, 300 series alloys (containing 1.25% manganese) are good general purpose alloys for storage tanks, piping, and chemical equipment. Manganese is also added to 2000, 5000, and 6000 series alloys to improve corrosion resistance. Extensive information is to be found in the article "Manganese Puts Muscle in Aluminum"—Winter 1961 edition of Union Carbide Metals Review).

Widest Aluminum Coiled Sheet

What is described as the world's widest aluminum coiled sheet (as well as plate) is being mass produced on a complete new "hot line" at the Reynolds Metals Company Alloys Plant at Sheffield, Ala.

Both the 170-inch wide reversing mill which heads up the new line and the four-stand 120-inch continuous strip mill at the other end are said to be the widest aluminum rolling mills in the world.

The new hot line—so called because it rolls heated aluminum—is capable of

producing coils weighing up to 30,000 pounds and almost seven feet in diameter to meet the growing fabricator demand for larger coils.

Wide sheet permit trailer manufacturers to consider "wrapping" the sides and front of an entire trailer with a single wide sheet of aluminum and top the trailer with another single wide sheet. Formerly trailer manufacturers found it necessary to rivet or weld smaller sheets together. The wide sheet reduces fastening and fabricating costs and decreases the possibility of leakage.

Tens-50—New Alloy

Aluminum castings with tensile strengths up to 50,000 psi may be made under normal foundry conditions through use of an alloy now offered by Reynolds Metals Company and its ingot distributors. Designated Tens-50, the alloy was developed for use in critically loaded aircraft and missile structures by the Los Angeles Division of North American Aviation. It may be used for any application demanding high-strength performance along with low weight. Reynolds has been licensed by North American's marketing subsidiary, Navan Products, to manufacture and sell the alloy.

Tens-50 castings have the following typical mechanical properties. Sand castings: tensile strength of 47,000 psi; yield strength of 38,000 psi and an elongation of four per cent. Permanent molds: tensile strength of 53,000 psi; yield strength of 43,000 psi and an elongation 7%. Tens-50 may be cast in both sand and permanent molds without the need for special tooling or extra procedures. Because of its high fluidity, wall thicknesses of $\frac{1}{8}$ inch may be cast in sand and $\frac{5}{32}$ inch in permanent

molds. The principle alloying elements are silicon and magnesium with small additions of beryllium.

The Slackening Demand for Major Non-Ferrous Metals

The slackening demand for the major non-ferrous metals such as copper, aluminum, lead and zinc has resulted in production cutbacks both here and abroad. The market for these metals does not react as quickly to a change in the economy as does steel but producers are optimistic for the long pull. Evidence of this is shown in the recent and projected expansion in production facilities for copper and aluminum in the United States and elsewhere.

It seems not to be generally known that well over half of the Free World silver production is used for industrial purposes because of its unique physical and chemical properties. The industrial and monetary demands for silver are increasing while production is decreasing. One authority has estimated that U. S. Treasury free stocks of the metal will be exhausted in 1961 at the present rate of withdrawal, with the obvious prediction of a rise in price.

The continued dependence of the uranium industry on purely political and military decisions creates some doubt as to the character of its future. The rapid growth of civilian demand for uranium is viewed with something less than optimism. However, in the light of the spectacular expansion of world energy requirements, the present surplus of conventional fuels cannot persist indefinitely, so that one might predict eventual rising prosperity for this industry. The nuclear metals generally, such as zirconium, hafnium and thorium should follow this trend.

Research work on thermo-electric devices continues to generate an enormous amount of interest. The development of a refrigerator with no moving parts and the generation of electricity from solar or atomic reactor heat sources with no mechanical parts is certainly now a practical probability. In some quarters it is thought that the demand for tellurium, which is used in the production of these

This report of some of the new developments and summary of recently available data pertaining to the broad field of non-ferrous metals is presented to implement the intent of the Jackling Bequest to the Western Society of Engineers.

devices, will outstrip the potential supply. Great interest is being shown, in fact, in all of the other so-called "electronic metals" such as silicon, gallium, indium and rhenium.

(Summarized from paper delivered by Ronald R. McNaughton, of Trail, British Columbia, Canada, before the American Institute of Mining, Metallurgical and Petroleum Engineers.)

Metals Handbook

A free, 32-page illustrated brochure has been issued by American Society for Metals to describe the content of its new Metals Handbook, 8th Edition, Vol. 1, "Properties and Selection of Metals." The brochure includes actual examples from each of the Handbook's major sections, with information on how the book was compiled by 1335 metalworking experts in association with 83 author committees representing every area of industry.

Four years in preparation, the new ASM Metals Handbook represents two

and a half times as much information on properties and selection of metals as in the last edition. Its 1300 pages include 6707 illustrations, 1841 tables, 2806 definitions, over 1500 examples and data compilations on 456 alloys. Major sections include Heat Resisting Alloys, Toll Materials, Nonferrous Metals, and special features on magnetic, electrical and other special purpose materials, a dictionary of technical definitions, and special indexes.

Tin-lead Solder Anodes Avoid Sludge Deposits

Tin-lead solder anodes of virgin metal so pure "sludge" deposits are virtually eliminated are now available. Impurities are limited to as little as .02% of bismuth and antimony. Other impurities are in proportionately low amounts.

They designed for plating electronic components and printed circuits, the anodes are produced in extruded form. As a result, they corrode more evenly

than the cast type.

(Anodes are a development of Alpha Metals, 56 Water St., Jersey City, N. J.)

Prevents Gas Porosity In Aluminum Castings

A metallurgical compound recently offered is designed to produce pressure-tight castings of aluminum when plunged to the bottom of the aluminum melt.

It evolves insoluble chlorine and other volatile chlorides which bubble through the molten metal as scavenging gases, removing hydrogen and non-metallic inclusions which cause defects and porosity in the casting.

Made in four grades, three of which combine a moderate grain-refining action with degassing in a single-step process. The product is available in 2 oz. to 4 lb. tablets, or powder, and is manufactured in grades suitable for all aluminum alloys and melting units.

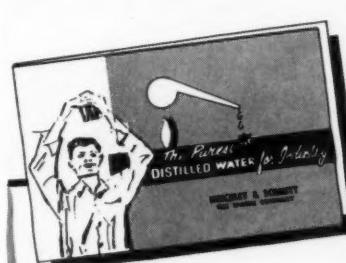
A brochure, designated as Leaflet No. B-2, may be obtained from Foundry Services, Inc., P.O. Box 8728, Cleveland 35, Ohio.

MOLYBDENUM HELPS FIND VALUABLE ORE DEPOSITS. Molybdenum is generally found with ores whose metals are valuable for industrial purposes. Using new method devised by U.S. Geological Survey scientists, these ores can be easily located by prospectors. Streams are tested for traces of molybdenum—one part per billion of water can be detected—by passing water sample through a resin. Resin is leached by acid; if the metal is present, acid solution turns amber.

An extended antenna has been designed for the Tellurometer System, Washington 6, D. C., to enable surveyors to measure lines across traffic, over brush, low trees, or other obstacles. The Tellurometer, an electronic device which employs micro-waves to determine distances, requires practically unobstructed line of sight conditions. Use of a mast up to 40 feet in height will permit measurement of lines across highways, low structures, and natural obstacles located between two survey points.

Engineers have been utilizing the Tellurometer System in lieu of traditional chaining or triangulation methods for establishing horizontal control for highways, bridges, power sites, transmission lines and pipelines. The electronic system operates through fog, smoke or light rain and measures lines from 500 feet to 40 miles in length.

Blasting with ammonium nitrate rather than more conventional blasting agents is saving a quarter of a million dollars annually at mines of the International Salt Co. This was reported by John L. Ryon, Jr., of Clarks Summit, Pa., assistant director of production to the Society of Mining Engineers of the AIME. Pneumatically-placed ammonium nitrate—fuel oil mixtures are being used in two mines, with plans for its application in a third underway. Each of these three mines conducted its own investigations.



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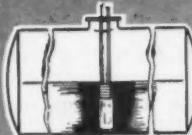


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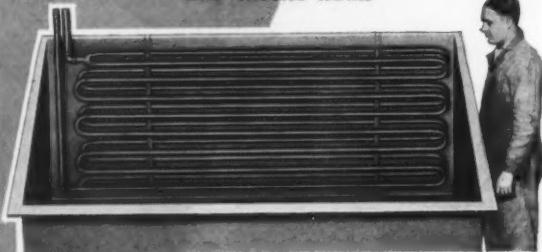
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RESEARCH—LEGISLATION

A relatively new organization now working vigorously to fight air pollution is the Industrial Gas Cleaning Institute, incorporated in 1960 in the State of New York. It was founded to further the interests of manufacturers of industrial gas-cleaning equipment, including, but not limited to, mechanical collectors, electrostatic precipitators, fabric collectors, and wet collectors, by encouraging the general improvement of engineering and technical standards in the manufacture, installation, operation, and performance of equipment; devising and improving methods of analyzing industrial gasses and, disseminating information on air pollution.

The organization will conduct studies and engage in research on methods for improving air pollution control. Air pollution is said to cost this nation 13 billion annually in cleaning bills, health and corrosion.

FOUR NEW SELECTIVE BIBLIOGRAPHIES are available from Office of Technical Service, U.S. Department of Commerce, Washington 25, D.C., collected from Army, Navy, Air Force, AEC, and other reports. They are: SB-423 POWDER METALLURGY (includes sintering, kinetics of oxidation of metal powders, other subjects); SB-427 MAGNETO-STRICKION (covers magneto-strictive materials, research in ferromagnetism, other areas); SB-432 THERMO-ELECTRICITY (treats unconventional electrical power sources, thermoelectric generators, other topics); SB-435 SEMICONDUCTORS (includes semiconducting properties of boron, surfaces in semiconductor devices, other subjects). \$1.00 each.

Utilities would be reimbursed when highway construction necessitated relocation of facilities if proposed legislation in a number of states became effective.

A Georgia proposal would require the State Highway Department to pay, or participate in, the costs of relocation of water and sewer lines owned by municipalities, counties and other governmental subdivisions. Indiana and Pennsylvania bills would hold relocation of utility facilities to be a cost of highway construction and payable from highway funds. The Indiana proposal would apply only to the Interstate System, while all Federal-aid highways would be affected in Pennsylvania.

On the other hand, a Massachusetts bill would repeal the permissive utility reimbursement legislation enacted in 1956. Another bill requires utility companies excavating ditches more than 50 feet long in roadways to resurface the entire width of the roadway. Montana proposals would prohibit reimbursement of utilities unless the utility owns the property upon which its facilities are located, and decrease the state's share of the relocation cost on Federal-aid highways from 75 per cent to 50 per cent.

New Mexico, Oklahoma and Arizona also have bills pending which include various provisions relating to the relationship of highways and utility sites and installation. (Summarized from Feb. 24th release—National Highway Users Conference, Washington 4, D. C.)

IS IT THE PROPER THING TO DO?

NOTE: This column deals with standards of conduct in the engineering field. The editor invites comments and criticisms on the ethical problems considered herein. Questions submitted on engineering ethics will be given careful attention. You should address your letter: The Editor, Midwest Engineer, 84 E. Randolph St., Chicago 1, Ill.

SITUATION: A governmental agency or a private organization requests proposals from three qualified engineering firms for the provision of certain engineering services. The request states that the proposal shall contain a fixed price or estimated cost for the engineering service to be performed.

QUESTION: Is it ethical for an engineering firm to submit a proposal in reply to this request?

REPLY: The engineer should not enter into competitive bidding for engineering services on the basis of cost to a client. The engineering firm should be guided by the same rule and refrain from entering into competitive bidding for engineering service on the basis of cost to client.*

COMMENT: "The Canon of Ethics for Engineers" of the ECPD does not specifically deal with this situation; however, section 2 broadly covers the topic ("... will avoid all conduct or practice likely to discredit or do injury to the dignity and honor of his profession"). Other codes are more specific. The ASCE states: "It shall be considered unprofessional ... to invite proposals for the performance of engineering services or to state a price for such services in response to any such invitation, when there are reasonable grounds for belief that price will be the prime consideration in the selection of the engineer."

The answer to the question will depend upon the particular society code

under which the engineer operates. Under a very rigid interpretation, he may feel the answer must be no. However, the more reasonable answer appears to be obtained by making his determination on the phrase "price will be the prime consideration." Thus, if he feels price is only one of many considerations, he should feel free to propose, but, if price appears to be considered without regard to qualifications, experience, and other important factors, he should not propose.

The above answer assumes the type of engineering services usually provided by structural engineers and many other consulting firms. However, it must be recognized that, in research and development contracts such as those awarded by the government, price estimates (usually on a cost plus, fixed fee basis) are an important consideration and that proposals on such a basis are considered as standard practice of the industry.

*An opinion of the Panel on Engineering Ethics of the Division on Education and Research of the Western Society of Engineers.

Test "Wood Brick" In "Pilot" Homes

"Wood Brick" is a unique "first" introduced to the U. S. construction by the Southwestern Settlement and Development Company of Jasper, Texas. This firm, a division of the East Texas Pulp & Paper Co., has already used its new product to build two "pilot" homes.

Why wood to make bricks?

O. R. Crawford, General Manager of the Southwestern Settlement and Development Company, gives the following explanation:

The "bricks" do triple duty as exterior finish, structure and interior finish—in short, comprising all elements of the wall.

While the idea is new in the United States, it started in South America, principally Chile, where "wood bricks" have been manufactured from all types of timber.

The 3½ inch square "wood bricks" are made in different lengths. Holes are factory drilled for two eight penny nails in each "brick," and for additional strength, glues are applied between "bricks." As each course of "bricks" is completed, small wood strips are inserted

in grooves in the vertical joints. Application of a caulking compound in grooves makes tighter and more weatherproof joint.

5½ Mile Conveyor Belt Serves Cement Plant

A 5½ mile belt conveyor used to transport raw materials from a quarry at Lawrence to two plants at Ada, Oklahoma has been highly satisfactory. This is the report of Thomas B. Douglas, vice president of operations of The Ideal Cement Company. He described the belt as being 28,553 feet in overall length and 36 inches wide.

The supporting structure consists of precast concrete channel sections supported, for the most part, on precast bents which, in turn, are supported on poured in place footing.

Actual installed cost of the belt conveyor was \$3,524,079. The belt is operated and maintained with two men and one supervisor. The belt conveyor, which has a capacity of 1,000 tons per hour, has many safety features not found in most belt conveyors.

(Mr. Douglas made his report before a session of the recent convention of the Society of Mining Engineers of AIME.)

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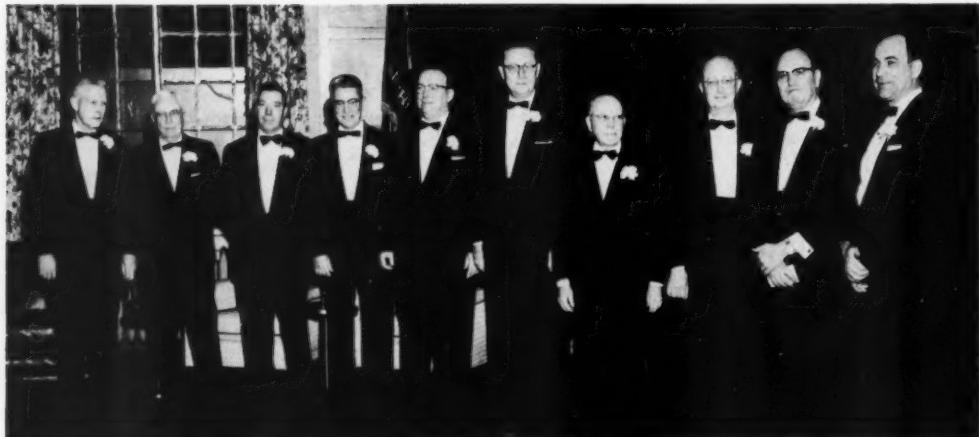
Washington Award



Presentation of the Washington Award for 1961 was made at a dinner held at the Furniture Club of America on the evening of March 2nd. Over 575 engineering society members and guests attended. The recipient was William V. Kahler, president of Bell Tell Telephone Company.

The Award Commission comprising representatives of the participating societies selected Mr. Kahler in recognition of his "exceptional leadership in advancement of communications, for distinguished service in civic affairs and for aid to education and humanity" Western Society of Engineers administers the Award.

Presentation of the token of the Award was made by Raymond D. Maxon, president of WSE, following the opening remarks of Virgil E. Gunlock, chairman of the Award Commission. Picture at left was taken just at the conclusion of the presentation.



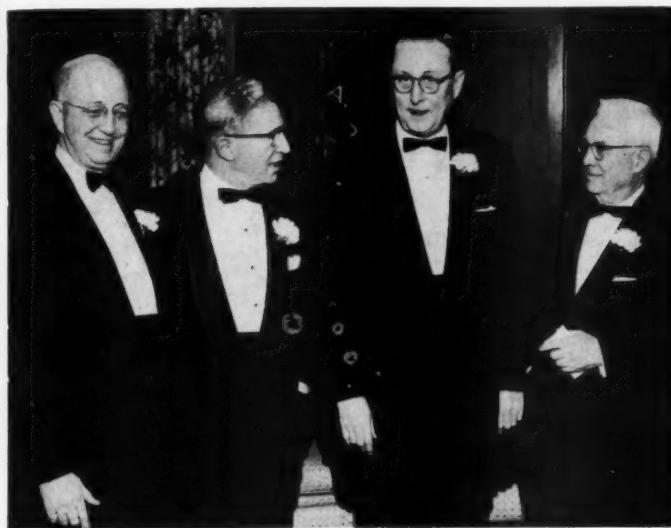
In picture above, taken at reception preceding dinner, are to be seen the guests who were seated at speaker's table L. to R.: R. B. Gear, AIEE; L. R. Howson, ASCE; R. D. Maxon, WSE President; William V. Kahler, 1961 recipient; V. E. Gunlock, WSE and Chairman of the Washington Award Commission; O. G. Smith, WSE; H. P. Sedgwick, 1960 recipient; T. R. Niles, ASCE; M. E. Nickel, AIMME; E. J. Carraro, ASME.



Guests at the speaker's table who paid tribute to Mr. Kahler included Herbert Payne Sedgwick, 1960 Washington Award recipient.

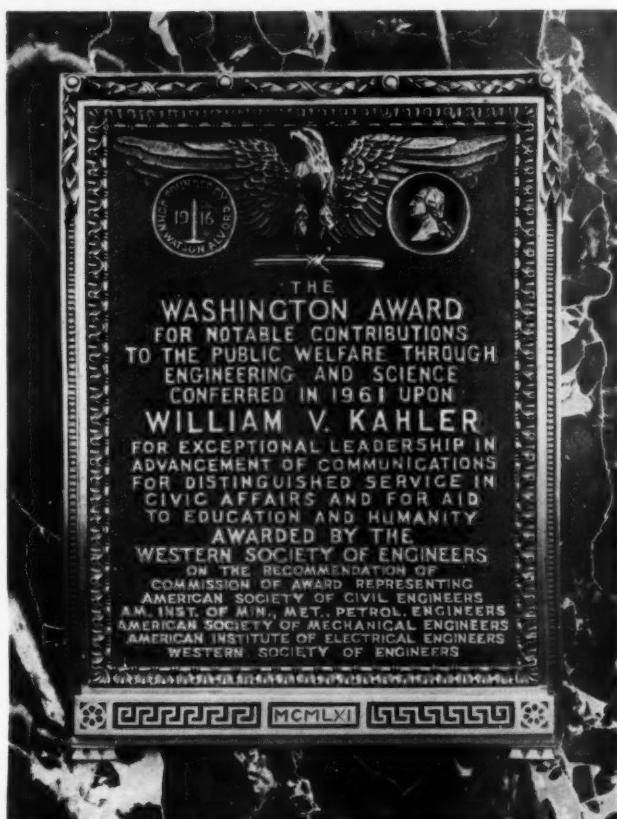
The ceremonies included a number of humorous overtones such as that seen at left. Here, Mr. Kahler receives a memento that evoked laughter from the guests as well as Mr. Kahler. Mr. Gunlock is the donor.

Award—1961—Presentation



L. to R.: T. R. Niles, Commission representative of the American Society of Civil Engineers, who spoke in concurrence of the Award; William V. Kahler; O. G. Smith, Illinois Bell Telephone and L. R. Howson.

Token of the Award (below) bears the official emblems and commendatory statement.



MIDWEST ENGINEER

PLOWING A STRAIGHT FURROW

Highlights from remarks by William V. Kahler upon receiving the Washington Award

"History tells of men who devoted half a lifetime to developing a philosophy and who spent the other half writing about it. My philosophy was not formed on so grand a scale. No book has been written about it. A book wouldn't be necessary—one sentence will do.

It was spoken by my father long ago. What he said was simply this: 'Plow a straight furrow.' In Missouri, at that time, no farmer had heard of contour plowing. You just plowed in a straight line—back and forth, until the job was done.

There were pleasant alternatives—going fishing. I still like to go fishing but we can't all do so whenever the spirit moves us. The trouble is—people try—not all the time—but they do leave things undone that need to be done.

When asked to help on the school board some are inclined to say—I haven't got the time—some one else is better equipped.' No straight furrows plowed there! In the same way we share blame for flaws in our educational process.

Now and then one needs to ask: "How good a plowman am I? What talents do I have to offer? What jobs need doing?"

The founder of the Washington Award—the late John W. Alvord—hoped it would encourage among young engineers what he called 'a broader understanding of their opportunities for public usefulness.'

An engineer has responsibilities to help solve the social problems he helps create through technological advance. Here his greatest value is technical know-how and ability to innovate.

The engineer who gives money without giving himself may be short-changing the community.

Medical sciences are exploring new frontiers—there is a great need for engineering know-how—researchers are getting ahead of their tools.

I'd like to suggest a committee of our professional societies to volunteer guidance to the Administration and Congress in rendering technical assistance abroad.

Professional engineering societies might well sink their plowshares in the fertile ground of the international field.

If what I've said encourages any engineers to look into opportunities for public usefulness, I've been plowing a straight furrow!

Important as these things are they will become academic unless we also meet the Communist challenge on the world's ideological battlegrounds. As Emerson said:

*What avail the plow or sail
or land or life, if freedom fail?*

Vertical Boom Trencher

A new trencher with a boom that enters the ground vertically has been introduced by Century Engineering Co., Waukesha, Wis. This feature enables it to work flush with walls, curbs and sidewalks. It can be hauled by car or truck and hitches by means of hydraulic controls. Unit digs 4 in. to 12 in. wide at variable depths.

Photos Show Slackline Cableways on the Job

A new catalog (C) shows how deep digging slackline cableways are used to recover sand and gravel deposits; clean river channels and settling ponds; excavate and haul bulk materials.

Table shows capacities of each size machine at varying haul distances. Components of the Slackline are described in detail. Pictures and drawings cover a variety of installation. Sauerman Bros., Inc., Dept. M-1, 620 S. 28th Avenue, Bellwood, Ill.

"Civic Aspects of the Airport Noise Problem"

As an engineering society of recognized high standing, W.S.E. is frequently asked to furnish members for committees of the city and state on public engineering problems. The Civic committee is deeply concerned with all engineering problems which affect the health, operation and beauty of the city. Some examples are civil service operations, registration laws, building codes, traffic problems, smoke abatement and recently, noise abatement.

Citizens Form Council

A series of test flights of the Caravelle Jet at Midway Airport on August 15, 1960 resulted in numerous telephone inquiries to the local Southwest News-Herald office about the noise of the jet. The newspaper announced on December 29, 1960 that delegates from the eleven civic groups near Midway representing approximately ten thousand citizens would meet on January 10, 1961 to discuss the possible use of jet planes at Midway and the formation of a "Southwest Council of Civic Organizations."

The Civic committee of W.S.E. agreed to sponsor a talk by Mr. Robert H. Brown, Sr., Vice-Chairman of the mem-

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bership committee and a noise control specialist for Western Electric Co., Inc., at the January 10th meeting. Copies of the talk, entitled "Analysis of Aircraft Noise," are available on request through the Civic committee.

At the noon luncheon meeting on March 8, 1961 at W.S.E. headquarters, Mr. Brown described the reaction of Southwest Chicago residents to the prospect of Cavarelle Jet flights at Midway and progress toward formation of the Southwest Council of Civic Organizations. He explained the disproportionate

noisiness of turbojet aircraft with charts and graphs illustrating the extreme sensitivity of the human ear to the high frequencies typical of turbojet noise in the general range of one thousand to six thousand cycles per second. After describing various solutions which have been proposed for controlling airport noise throughout the world, Mr. Brown concluded his remarks with an appeal to the engineering profession for a technological break-through on jet noise reduction as the best possible solution to the airport noise problem.



Bob Brown is a '52 Purdue graduate—B.S. degree in physics. Joined Western Electric Co. in 1953. He has taken advanced courses at Purdue, University of Chicago and M. I. T.

In his current role as an acoustical engineer, he is functional for the Acoustic and Noise Problems of Western Electric Company plants in the Chicago area, and is advisory to other Western Electric locations throughout the country. He is a member of the American Industrial Hygiene Association and a member of The Western Society of Engineers. He is now serving as vice chairman of the Membership Committee of The Western Society of Engineers.

Bob has presented several talks on sound and noise to various technical and civic groups.

Currently he is serving as acoustical consultant to Southwest civic organizations which are concerned with the noise problems which might accompany the introduction of caravel jets to Midway Airport.

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Herbert H. Howell, Chief of Aviation Plan'g., City of Chicago, Dept. of Aviation, City Hall.

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Pneumatics Applied in Computing Devices

A challenge was offered the electronic computer by a display at the National Exposition of Power & Mechanical Engineers held in New York late last year. It illustrated the application of pure pneumatics in the same field. Computer elements without moving parts have been developed which can amplify, feedback,

digitalize, remember and compute. Pneumatic systems can be arranged to perform the same functions as electronic devices. They will offer such advantages as ruggedness, thermal stability, lack of fire hazard, high reliability, indefinite shelf life, lower cost and lower maintenance. Prototype units illustrating the concept were exhibited.

Of direct interest to the power industry was a 10,750 kw package power

plant developed for supplementary and emergency service for public utilities, of which four units have already been sold. This plant is complete in every respect, sectionized and housed ready to be mounted and immediately tied in as soon as it has been unloaded and skidded into place on the rails of a concrete foundation, which is the only provision the customer has to make in advance.

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Pocket Penetrometer for Concrete Mortar

A new pocket style Concrete Mortar Penetrometer for field and laboratory evaluation of the "initial set" of concrete has been developed by Soiltest, Inc., Chicago.

The penetrometer which is only 7 inches long can be used in conjunction with ASTM test C-403. The test procedure involves forcing the 1/20 square inch steel penetrometer shaft into concrete mortar to a depth of one inch scribed on the shaft. The resistance in pounds per square inch is shown on the penetrometer's direct reading scale by the indicator sleeve which automatically holds its position until released. The scale range is from zero to 700 pounds per square inch.

It has been established that the point of "initial set" of concrete has been reached when penetrometer penetration is 500 psi. "Initial set" is the semi-hardened, partially hydrated condition

of the concrete beyond which it can no longer be worked nor consolidated by vibration. Time of initial set of concrete is often controlled by use of chemical admixtures. The penetrometer has also been used for evaluation of the time of set of light weight concrete and special roof deck mixes. Complete information is available from Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

A series of case study portfolios on "Fatigue-Proof" Steel Bars deals with the effect of "Fatigue-Proof" on end costs in typical parts applications. It reveals dollar-and-cents savings in individual studies on: (1) An adapter for a coil winding machine; (2) A diesel pump fitting; (3) A foundry flask guide pin; (4) An oil pump distributor shaft; (5) A generator armature shaft, as well as five additional examples.

A free copy may be obtained by writing to W. E. Schneider, La Salle Steel Co., P.O. Box 6800-A, Chicago 80, Illinois. Ask for Case Study Portfolio No. 2. Brookfield's Seven Seas Panorama

Obituaries

We regret to learn of the death of Dr. Charles W. Morey who had been a member of the Western Society of Engineers since 1906. Dr. Morey died in Milwaukee on March 2nd. He was president and co-founder of Chicago Technical College. The college was started in 1904 as an evening training school in structural drafting. Dr. Morey was a graduate of Purdue University, receiving his bachelor's degree in 1897. For a number of years he maintained offices as a consulting engineer. He became a life member of WSE in 1938.

At the Purdue Commencement Exercises in 1937 he received an honorary degree of Doctor of Laws for his work as "a pioneering educator and loyal alumnus for over forty years."

The same spirit had characterized his great interest in the progress and welfare of the Society.

Howard P. Harrington, consulting engineer, partner in the firm of Bergendahl & Klein, died February 25th. Mr. Harrington, who was 72, has been a member of WSE since 1920 and attained life membership in 1950. In his earlier years, after graduation from Cornell College, he was associated with firms specializing in bridge construction and with the Chicago and Northwestern Railroad. Following that he was active for many years as a consulting engineer.

Carl E. Brockhausen, consulting engineer and a WSE member since 1914, died on March 6th. Mr. Brockhausen was born in Lansing, Iowa in 1876. Shortly after graduating from Iowa State College, with a Bachelor's Degree in mechanical engineering, he began work in the railway field and continued in such activity for some ten years. Later, and for many years thereafter, he was in the contracting business. More recently, he had maintained his engineering offices at 20 West Jackson Blvd.

He had characteristically identified himself with the activities of WSE and had attained life membership status in 1945.

Richard F. Graef, vice president, Knoerle, Graef, Bender & Associates, Baltimore, Md., died February 6th. He had been active with this engineering firm since 1953. He was a Civil Engineering graduate of Cornell University.

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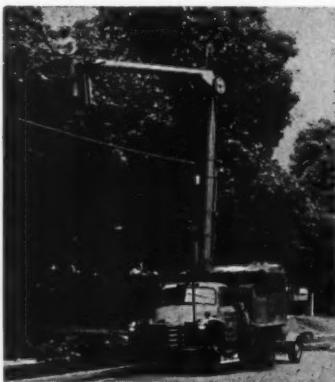
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Attention, Mr. Earl Reynolds



Reviews of Technical Books



Modern Mathematics for the Engineer

Modern Mathematics for the Engineer. Edited by Edwin F. Beckenbach. McGraw-Hill Book Company, Incorporated, New York 36, N. Y. Pages, 456. Price, \$9.50.

Like the first series, published in 1956, this work is unique in giving such a broad survey of the applications of advanced mathematics to today's rapidly expanding technology. It is the result of the 1958-1959 series of lectures by experts on advanced applied mathematics, conducted by the University of California, through University Extension.

The material is divided into 3 parts: Mathematical Methods, Statistical and Scheduling Studies and Physical Phenomena. The book is intended for engineers, scientists, mathematicians, students, teachers and others who wish to keep abreast with current applied mathematical developments, resulting largely from the demands of modern engineering programming and design.

Mathematical applications explored are put in concrete perspective through many uses to physical and engineering problems. Attention is directed to the rapidly expanding probabilistic and statistical methods that are having such a strong impact on today's physical, biological, economic, and sociological technology. Consideration is given to random-walk questions, queuing problems, information theory, control processes, linear programming and inventory processes.

W.L.R.

Cost Reduction and Profit Improvement

Cost Reduction and Profit Improvement. Sponsored by the Machinery and Allied Products Institute and its affiliate, the Council for Technological Advancement, Washington 6, D. C. Pages, 67. Price, \$2.00.

This pamphlet contains observations on cost reduction and profit improvement of 14 capital goods executives covering manufacturing, marketing, purchasing and finance. Their views emphasize the responsibility of top management.

ment and at the same time underline the need for a full team effort involving all parts of the organization.

The objectives of the Institute is to focus attention upon the salient factors effecting cost reduction and profit improvement. Also, to analyze factors and impressions that will react favorably to enlightened interpretation by capital goods people and their customers, throughout the country.

W.L.R.

Adaptive Control Systems

Adaptive Control Systems. Edited by Eli Mishkin and Ludwig Braun, Jr., McGraw-Hill Book Company, Incorporated, New York 36, N.Y. Pages, 533. Price, \$16.50.

This book is an outgrowth of a series of lectures presented by the Electrical Engineering Department of the Polytechnic Institute of Brooklyn, in 1959, in the form of an extension course for a list of companies participating in the Industry Research Associates program.

These writings by eleven contributors constitute a slightly coordinated approach to theory and application as related to the major aspects of feed back control systems — specifically, adaptive systems. In recognition of the growing importance of large scale systems in the technology of great industries and the military, this work is designed to fulfill the needs of graduate students and industrial engineers alike. This book enlightens a new field in which as yet few adequate texts exist.

Part one deals with linear systems, establishing a conceptual view, then identification problem and important and unusual design problems. Part two, in its presentation of nonlinear systems, delves into the aspects of design and analytical theory linked to these systems. Part three is concerned with adaptive systems. An account is given of some types of adaptive systems, mostly control systems, which have been developed at industrial research laboratories. The final section is appropriately devoted to mathematical aids to analysis and design in the field of adaptive control.

Among these essential mathematical tools are: digital techniques, game-theory and linear programming, decision theory, analysis of queueing systems, and multistage decision processes.

W.L.R.

Organizational Systems and Engineering Groups

Organizational Systems and Engineering Groups: A Comparative Study of Two Technical Groups in Industry by Louis B. Barnes. Division of Research, Harvard University Business School, Soldiers Field, Boston 63, Mass. Pages, 188. Price, \$3.50.

This book is a study of the relationship between various attributes of organizations and their consequences for group development, productivity, and satisfaction of engineers and other technically trained employees. It considers, among others, these important questions:

(1) How does the pattern of authority in an organization affect the behavior of engineers in their work groups? (2) What are the effects of different degrees of individual and group autonomy on the motivation, productivity, and satisfaction of engineers? (3) Does a relatively free (or restricted) opportunity for interaction among engineers affect their group development? (4) In what ways do the conflicting values of science and business affect group development, productivity, and satisfaction within different organizational environments?

Many technical organizations are conducting experiments involving methods of motivating and organizing engineers and scientists. This book should throw additional light on a fruitful direction for such experimentation and the conditions under which these efforts may be expected to succeed.

Besides offering material for administrators, this study contributes findings and research methods to the field of organizational behavior.

The author, Louis B. Barnes, is Assistant Professor of Business Administration at the Harvard Business School and a member of the teaching group of the first-year course in Administrative Practices.

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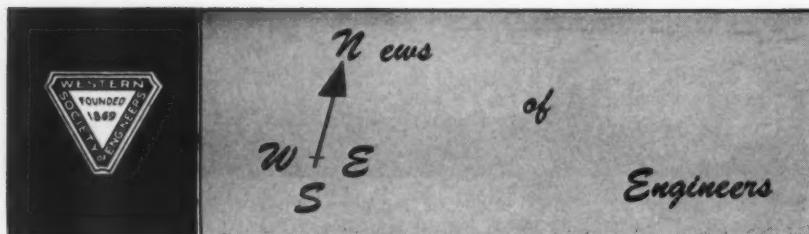
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Personable People

Speaker at the March 15th Civic Committee Meeting and Dinner was Mr. Jack Sheaffer of the Northeastern Illinois Metropolitan Area Planning Commission. He gave an exceptionally informative talk on "Flood Hazard Mapping in Metropolitan Areas."

Eldon A. Imhoff, general superintendent of personnel for Chicago Transit Authority, retired on April 1 after 42 years of service in various capacities with local traction companies.

Mr. Imhoff, who was graduated from the University of Iowa in 1917 with a bachelor of science degree in electrical engineering, started to work as an engineer with the former Chicago Rapid Transit Company in April, 1919. In 1926, he was appointed assistant electrical engineer, and in 1937, became electrical engineer of that company. In June, 1947, he was named assistant to the general manager of the "L" company, and on October 1, 1947, following the takeover of the rapid transit and surface systems by CTA, he became management assistant for CTA. He was appointed to the position of general superintendent of personnel on July 1, 1953.

As electrical engineer for the former Chicago Rapid Transit Company (1936-

47) he was responsible for the design of the electric power supply and power distribution system in the State Street subway, which opened on October 1, 1943.

The appointment of John E. Angst as general manager of General American Transportation corporation's freight car division was announced by Herman Altshulz, division vice president. Angst was vice president of ACF Industries' car division in New York for the last four years.

Alf Kolflat, senior partner of Sargent & Lundy, Chicago consulting engineers, retired from the firm on March 31, 1961, and Frank V. Smith has been named as his successor.

Mr. Kolflat had served as senior partner since 1954. He joined the staff in 1925 and was admitted as a member of the firm in 1938. He is a graduate mechanical engineer from the Norway Institute of Technology and is a member of the American Society of Mechanical Engineers, American Nuclear Society and the Western Society of Engineers.

Mr. Smith joined the firm in 1927 and was admitted to the partnership in 1945. He served as Chief Electrical Engineer from 1946 to 1953 and in 1954 was

appointed General Manager. He was born and educated in Australia, receiving his engineering degree from the University of Melbourne. He is a Fellow of the American Institute of Electrical Engineers and a member of the National Society of Professional Engineers and the Western Society of Engineers.

De Leuw, Cather & Company, Chicago, consulting engineers with offices in several other cities, announces the reorganization of its Board of Directors as follows:

*C. E. De Leuw, President,
L. H. Cather, Executive Vice President,
R. H. Anderson, Vice President,
J. E. Linden, Vice President,
W. R. McConochie, Vice President,
R. B. Richards, Vice President,
V. E. Staff, Vice President.*

These seven men have served an average of 25 years each in the organization, which was founded by Mr. De Leuw in 1919. The growing activities of the company, now conducting a world-wide business in all phases of transportation engineering, was given as the reason for the change.

John P. Henebry has been appointed to the new post of director of the water division of Fairbanks, Morse & Co., Thomas G. Lanphier Jr., president, announced. The water division manufactures and will market machines for desalting sea water.

Ellis Danner, professor of Highway Engineering at the University of Illinois, has been elected president of the Educational Division of the American Road Builders' Association.

Mr. Danner, a former Illinois Division of Highways engineer, began his teaching career at the University of Illinois in 1946. In addition to being professor of Highway Engineering, he is director of the Illinois Cooperative Highway Research Program. He is a

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member of numerous technical and professional committees, and the author of numerous articles and addresses on highway planning, research and construction.

Meissner Engineers, Inc., Chicago, has announced the appointment of Frank L. Giordano to the position of vice president.

Giordano brings to the company 20 years experience in the chemical industry. He served as director of engineering of Velsicol Chemical Corp., prior to joining MEI. Before joining Velsicol, Giordano served in engineering and plant management positions with various divisions of General Mills, Inc., General Analine and Film Corporation, General Chemical Co. and E. F. Drew and Company.

With the mounting concern over water supplies, water pollution and efficient sewage control it is interesting to note recognition of outstanding attainment in this field in our own area.

William W. Mathews, superintendent of Gary Sanitary District, was presented an award for outstanding operation of the local sewage treatment plant.

The William D. Hatfield award was given by the Water Pollution Control Federation at the last annual conference of Indiana Sewage and Industrial Wastes Assn., at Indianapolis.

Harry E. Schlenz, of Chicago, vice president of the Water Pollution Control Federation, made the presentation.

Candidates for the award were evaluated on efficiency of plant operation, housekeeping, public relations, compilation of routine operation data and preparation of an annual report.

Mathews has been superintendent here since Sept. 1, 1940.

A graduate of the University of Wisconsin, he is a registered professional engineer.

J. Thomas Timmins, vice president and general manager of Chromium Mining and Smelting Corp., announces the appointment of Edward T. Johnson as vice president-operations for this corporation and its subsidiary companies.

The appointment of Dr. H. A. Gorges to the new position of director of advanced products of Cook Electric Company's technological center was an-

nounced by W. C. Hasselhorn, president. Gorges formerly was scientific assistant to Werner von Braun, director of the aeroballistics division of the space flight center, Huntsville, Ala.

Charles W. Wyman, senior staff engineer and industrial hygienist at Western Electric Co.-Hawthorne Station and a member of WSE, is the author of an article "New Standards Needed for Safety Clothing." This was published in the *National Safety News* for March. Mr. Wyman has been working intensively in this field at Western Electric since 1939. He is a member of the American Industrial Hygiene Assn. and past president of the Chicago Chapter.

Mr. Hans Phirring, Emeritus Professor of Physics of the University of Vienna, Austria, was scheduled to talk before the Sigma Xi Chapter of the Illinois Institute of Technology on April 17th at the Chemistry Auditorium. Subject announced—"Space Conquest — A Blind Alley." He comes to this country at the invitation of Dr. Wiesman of I. I. T. Dr. Phirring, a noted scientist, will talk at various universities from coast to coast.

The appointment of Jack W. Gunstream as assistant plant manager of U. S. Steel's Gary plant of American Bridge Division was announced today by Royce D. Northcutt, plant manager. A native of Orange, Texas, Gunstream was assistant to the plant manager of the American Bridge plant in Orange at the time of his promotion. He attended Lamar College in Beaumont, Texas, and later the University of Texas in Austin, where he studied for his civil engineering de-

gree. He is a past president of the Texas chapter of the National Society of Professional Engineers.

A. E. Staley Mfg. Co., Decatur, Ill., has named Nat Kessler director of process engineering. Roger J. Mauterer succeeds him as chief chemical engineer for the corn, soybean and chemical processing concern.

Kessler, a native of St. Louis, joined Staley's in 1944. Before his recent promotion, he was chief chemical engineer. A graduate of Washington University, Kessler holds BS and MS degrees in chemical engineering.

Mauterer began his Staley career in 1948 as a junior chemical engineer. He became a chemical engineer in 1953, a senior chemical engineer in 1959. Mauterer, a native of Belleville, Ill., graduated from the University of Illinois with a BS degree in chemical engineering.

Frank A. Arendt, president of Arco Corp., Fort Lauderdale, Florida has announced the appointment of Ernest D. Cone as executive vice president. Mr. Cone, formerly of Kansas City, Mo., was the creator of Dundee Manor on the outskirts of that community.

Also now associated with Arco is E. I. Williams as construction director, who has long been identified with major hydro-electric and steel plant projects in top supervisory capacities. He was also superintendent of building for the Atomic Energy Power Plant at Shippingport, Pa.

Active with Arco, on a consulting basis, is Lt. Col. Lester Weaver, former Commander of Air Force Base, Wichita, Kansas.

One of Arco's most recent projects is the new Glidden Paint Co. building.

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Ludwig Skog, former president of Sargent & Lundy was selected as an immigrant of the year by the Immigrants Service League at its 53rd annual meeting held last month. He was cited for his service to his profession and his chosen community.

Ralph R. Bartelsmeyer, chief highway engineer of the Illinois Division of Highways, is the new president of the American Road Builders' Association.

The 7,000-member national organization is representative of all segments of the highway industry and highway engi-

neering profession.

An Illinois native, Mr. Bartelsmeyer took his civil engineering degree at the University of Illinois in 1931. He was for 12 years county highway engineer in Washington County, Ill., and for 5 years county highway engineer in St. Clair County, Ill. He was for two years a field engineer for the Marquette Cement Manufacturing Co. of Chicago. Becoming Illinois' chief highway engineer in 1953, Mr. Bartelsmeyer has been in charge of a program which has more than tripled in size during his administration.

American Power Conference Attendance Tops 3,000

The twenty-third annual meeting of the American Power Conference was held on March 21-23, 1961 at the Sherman Hotel in Chicago. The meeting, sponsored by the Illinois Institute of Technology in cooperation with fourteen uni-

events, comprising 101 papers in all, covering all phases of the power industry. Among the principal speakers who addressed the conference were Mr. William F. Crawford, President of Edward Valves, Inc., and of Republic Flow Meters Company; Dr. Howard A. Meyhoff, Executive Director of the Scientific Manpower Commission, Washington, D. C.; Mr. Sherman A. Knapp, President of the Edison Electric Institute; Senator

Raymond D. Maxson, president WSE, **Titus Le Clair**, Luncheon speaker, and **Joseph C. Boyce**, Dean, Graduate School, I.I.T.



versities and nine technical societies broke all previous attendance records with a registration of 3016 persons.

There were a total of 33 sessions and

George E. Drach, Majority Whip of Illinois State Senate in Springfield; Mr. Hubert G. Ebdon, President of Combustion Engineering, Inc.; and Mr. Titus Le

Clair, a past president of the Western Society of Engineers.

The luncheon meeting at which Mr. Le Clair spoke was sponsored by the Western Society of Engineers with Mr. Raymond D. Maxson, president of WSE presiding. Mr. Le Clair, Manager, Nuclear Power Applications, General Atomic, San Diego, Calif., spoke on the Future of Atomic Energy. His address was beautifully illustrated with colored slides that were flashed onto the screen automatically.

The status of nuclear fusion and nuclear fuel cells as a potential future source of power was discussed at the Evening Forum in which Dr. R. E. Henderson of General Motors Corp., Dr. Stirling Colgate of the Lawrence Radiation Laboratory of the University of California and Dr. C. W. Little, Jr. of C-Stellerator Associates of Princeton, N. J., participated.

Director of the conference is Dr. R. A. Budenholzer of Illinois Institute of Technology, a member and chairman of the Fuels Division of WSE.

Hinckley & Schmitt—one of Chicago's truly pioneer enterprises—is now in its 75th year. It was founded when public drinking water supplies were not too trustworthy. It hauled pure water from springs far removed from Lake Michigan. Although the people of Chicago have now for many years enjoyed a fine and safe water supply the firm continues to sell more and more bottled water for drinking (and industrial) purposes. In 1961 more than 7 million gallons of water were distributed for table use. The company also produces distilled water for food, pharmaceutical, and many other industries.

Centex Industrial park in Elk Grove Village has recently sold seven parcels of land totaling 1,200,000 square feet on which new buildings with 300,000 square feet of area are planned.

The transactions totaled \$2,700,000. So far 79 companies are in Centex park. On five of the seven recent land acquisitions, construction will be started immediately.

These are Uddeholm Steel Manufacturing company; Photo Materials company; Seko Tool and Engineering company; Allen Aircraft Radio; and Heinemann Bakery.

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MEMBERS OF THE SOCIETIES SHOWN ABOVE MAY PUBLISH FREE ADVERTISEMENT ON THIS PAGE BY REGISTERING AT THE NEAREST E.S.P.S. OFFICE. A WEEKLY BULLETIN OF POSITIONS OPEN IS AVAILABLE BY SUBSCRIPTION AT \$4.50 A QUARTER.

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POSITIONS AVAILABLE

This page is published to implement the intent of the James H. Brace bequest.

C-8588 PLANT OPERATIONS ENGR. Grad. CE age to 40; Must have practical exper. in all phases of concrete engrg. such as materials, redi-mix plant operations, quality control, etc. Good opportunity with progressive company sal. to \$9600 dep. on exper., loc. Chgo. Area, employer will pay the fee.

C-8566 PLANT PROJECT ENGR. Mech. Grad. age to 40; Background in foundry or steel mill. Must have creative mind, assemble components parts of eqpt. to meet company's needs. Good on details. Installation of eqpt. for a smelter sal. \$7500/10,000 loc. Calumet Area, employer will pay the fee.

C-8547 SR. DESIGN ENGR. BSME 4 yrs. machine design exper. Design of new or experimental strapping tools & machinery. Check finished drawings of tools & accessories. Ascertain customers req'mts. Analyze new experimental designs of eqpt. & investigate complaints. Supv. & coordinate work of assigned engrs. & draftsmen for a producer & mfgr. of steel & steel products sal. to \$10,500 loc. Chgo., employer will pay the fee.

C-8527 CHIEF IND. ENGR. Grad or equiv. 15+ yrs. exper. Will be concerned with time incentive standards, methods, plant layout, material handling, packing, preparation of cost information & production control & timekeeping procedures for a mfgr. of bedding sal. \$9/11,000 loc. Chgo. employer will pay the fee.

C-8520 DESIGN & DEVEL. ENGR. age to 30; BSME-accredited univ. 3+ yrs. exper. as design & devel. engr. on mech., pneumatic or hydraulic flow controls, or

instruments, incl. valves, pneumatic switches & motors, thermostats, servo-mechanisms, meters, recording devices or small mechanisms. Imaginative, resourceful individual with a high mech. aptitude & knowl. of mfg. problems & methods, sal. \$7/8,000+ fringe benefits & profit sharing loc. Chgo. Area, employer will pay the fee.

C-8355 STRUCT. ENGR. BS-Arch.E. or CE age to 55; Design of steel & reinforced concrete structures for med. size arch. & engrs. office specializing in indust. bldgs. Must have sufficient exper. & knowl. of bldg. construction to be able to design efficient, econ. structures; resp. incl. analysis, design, engrg. drawings, checking shop details & decisions on matters concerning struct. matters during constr. Position requires man with ability to produce, Struct. engrs. license desirable for an arch. & engrg. firm sal. to \$10,000 dep. on exper. loc. Chgo., employer will negotiate the fee.

C-8510-D PROCESS ENGR. Grad. Chem. Engr. preferred. Process & product devel. investigate processes for tanks, pressure vessels, environmental chambers, nuclear power plants, etc. sal. open dep. on exper., loc. So. Chgo. Area, employer will pay the fee.

C-8488 TECHNICAL ADVERTISING COPYWRITER Grad. EE or ME age to 35; Duties: To write tech. industrial advertising copy for metal working, electronics or bldg. fields. Eventually work into asst. account executive, sal. \$7/-

8,000 loc. Chgo., employer will pay the fee.

C-8570 MACHINE DESIGN ENGR. ME degree pref. age to 45; Initiate & follow-thru on design of automated assembly eqpt. to replace present hand assembly methods. 3-5 yrs. in design of automatic machinery for feeding & assembly of miniature & small parts essential. Some shop exper. very helpful sal. \$9500/12,000 loc. Chgo., employer will pay the fee.

ENGINEERS AVAILABLE

MW: 2132 STRUCTURAL, DESIGNER, OFFICE ENGR. BSCE 35; 10 yrs. in field & office following the design & construction of industrial type bldgs. sal. \$9,000, loc. Chgo. Area.

MW: 2133 PROJECT MANAGER BSME 42; 10 yrs. exper. heavy chem. plant utilities & process design. 4 yrs. devel. & design of construction eqpt. Economic evaluations, coordination of all phases of projects, planning & scheduling. sal. \$10,500 min. with incentives, loc. West or Midwest.

MW: 2134 PLT. MGR. INDUSTRIAL ENGR. GRAD. IE 42; 14 yrs. top mgmt. heavy fab. & machine shop. electro-mech. wood finishing, & sheet metal. Dean of Ind. Engrg. Put. College, Chgo. sal. open. loc. open.

MW: 2135 PROJECT ENGR. BSME 47; Extensively rounded out exper. in field of metal workings; machine & conveyor design, tool design, methods, production process, plant layout, eqpt. specifications & installation, material handling & maint., sal. \$9,000 loc. Chgo.



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